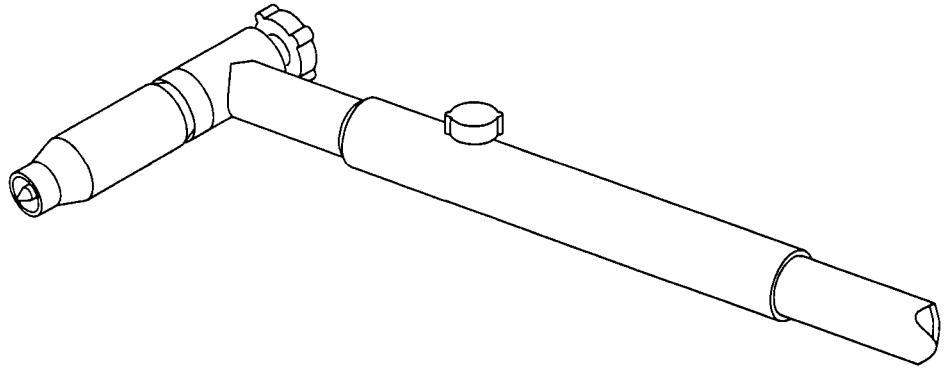
Miller®

March 1991 FORM: OM-1561

Effective With Style No. JJ-23

MODEL: MTTC-1512HR
MTTC-1525HR
MTTC-1512NR
MTTC-1525NR
MTTC-1512VHR
MTTC-1525VHR
MTTC-1512VNR
MTTC-1525VNR



OWNER'S MANUAL

IMPORTANT: Read and understand the entire contents of both this manual and the power source manual used with this unit, with special emphasis on the safety material throughout both manuals, before installing, operating, or maintaining this equipment. This unit and these instructions are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate, or maintain this unit. Contact your distributor if you do not fully understand these instructions.

MILLER ELECTRIC Mfg. Co.
A Miller Group Ltd., Company

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SA-120 674

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LIMITED WARRANTY

EFFECTIVE: AUGUST 6, 1990

This warranty supersedes all previous MILLER warranties and is exclusive with no other guarantees or warranties expressed or irnplied.

LIMITED WARRANTY – Subject to the terms and conditions hereof, MILLER Electric Mfg. Co., Appleton, Wisconsin warrants to its Distributor/Dealer that all new and unused Equipment furnished by MILLER is free from defect in workmanship and material as of the time and place of delivery by MILLER. No warranty is made by MILLER with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any. All engines are warrantied by their manufacturer for two years from date of original purchase, except Deutz engines which have a one year, 2000 hour warranty.

Except as specified below, MILLER's warranty does not apply to components having normal useful life of less than one (1) year, such as spot welder tips, relay and contactor points, MILLERMATIC parts that come in contact with the welding wire including nozzles and nozzle insulators where failure does not result from defect in workmanship or material.

MILLER shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources, robots, and components ..... 1 year
2. Load banks ..... 1 year
3. Original main power rectifiers ..... 3 years (labor – 1 year only)
4. All welding guns, feeder/guns and torches .... 90 days
5. All other MILLERMATIC Feeders ..... 1 year
6. Replacement or repair parts, exclusive of labor 60 days
7. Batteries ..... 6 months

provided that MILLER is notified in writing within thirty (30) days of the date of such failure.

As a matter of general policy only, MILLER may honor claims submitted by the original user within the foregoing periods.

In the case of MILLER's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be, at MILLER's option (1) repair or (2) replacement or, where authorized in writing by MILLER in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized MILLER service station or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at Customer's risk and expense. MILLER's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a MILLER authorized service facility, therefore, no compensation for transportation costs of any kind will be allowed. Upon receipt of notice of apparent defect or failure, MILLER shall instruct the claimant on the warranty claim procedures to be followed.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

EXCEPT AS EXPRESSLY PROVIDED BY MILLER IN WRITING, MILLER PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND *NOT* FOR CONSUMERS OR CONSUMER USE. MILLER'S WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND MILLER'S WARRANTIES TO, ANY CONSUMER.

RECEIVING-HANDLING

Before unpacking equipment, check carton for any damage that may have occurred during shipment. File any claims for loss or damage **with the delivering carrier**. Assistance for filing or settling claims may be obtained from the distributor and/or the equipment manufacturer's Transportation Department.

When requesting information about this equipment, always provide the Model Description and Serial or Style Number.

Use the following spaces to record the Model Designation and Serial or Style Number of your unit. The information is located on the data card or the nameplate.

Model _____

Serial or Style No. _____

Date of Purchase _____

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SECTION 1 – SAFETY RULES

WARNING: UNSAFE PROCEDURES OR PRACTICES can cause serious personal injury or death.

- *Read, understand, and follow ALL of these safety rules before installing, operating, or servicing this equipment.*
- *Be sure that all end users of this equipment, the operator and helpers, read and understand these safety rules.*

1-1. PREVENT ELECTRIC SHOCK

Touching live electrical parts can cause severe burns to the body or fatal shock. Severity of electrical shock is determined by the path and amount of current through the body. Therefore:

1. Do not touch live electrical parts.
2. Do not work in wet or damp areas.
3. Wear dry insulating gloves and body protection.
4. Disconnect all power before installing or servicing this equipment.
5. Turn off all equipment when not in use.
6. Properly install and ground the welding power source according to its Owner's Manual and all applicable codes.
7. Do not use worn or damaged cables or cables that are too small or poorly spliced.
8. Do not wrap cables around your body.
9. Do not touch electrode and any grounded object or circuit at the same time.
10. Use only well-maintained equipment. Repair or replace damaged parts at once.

1-2. PROVIDE PROTECTION FROM FUMES AND GASES

Breathing welding fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes.
2. Use adequate ventilation in the work area to keep fumes and gases from your breathing zone and the general work area.
3. If ventilation is inadequate, use an approved breathing device.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for any materials used.

1-3. PROTECT EYES AND SKIN FROM ARC RAYS; PROTECT EARS FROM NOISE

Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

1. Wear a welding helmet fitted with a proper filter lens (see ANSI Z49.1 for detailed information).
2. Wear a welding helmet fitted with a proper filter lens (see ANSI Z49.1 for detailed information).
3. Use protective screens or barriers to protect others from flash and glare.
4. Wear protective clothing and foot protection.

1-4. PREVENT FIRES AND BURNS

The hot workpiece, hot equipment, other hot metal, spatter, and arc sparks can cause fires and burns.

1. Wear correct eye, face, and body protection in the work area.
2. Allow work and equipment to cool before handling.
3. Do not weld near flammable material.
4. Watch for fire, and keep a fire extinguisher nearby.
5. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes," available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. PROTECT COMPRESSED GAS CYLINDERS

Since gas cylinder are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinder so that they cannot fall or tip over by fastening them to a mounting bracket, wall, or other stationary support.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.

1-6. PROVIDE PROTECTION FOR SPECIAL SITUATIONS

1. Do not weld or cut containers or materials which have held or been in contact with hazardous substances unless they are properly cleaned and inspected.
2. Do not weld or cut painted or plated parts unless special ventilation is provided to remove highly toxic fumes or gases.

3. Since welding can affect pacemakers, keep all pacemaker wearers out of the work area. Have them consult a doctor before coming near a welding operation.

1-7. PROVIDE PROPER EQUIPMENT MAINTENANCE

Improperly maintained equipment can result in poor work, but most importantly it can cause physical injury or death through fires or electrical shock. Therefore:

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are fully qualified.
2. Before performing any maintenance work inside a power supply, disconnect the power supply from the electrical power source.
3. Maintain cables, grounding wire, connections, power cord, and power supply in a safe working order. Do not operate any equipment in questionable condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres, and inclement weather.
5. Keep all safety devices, guards, panels, and covers in position and in good repair.
6. Use equipment for its intended purpose. Do not modify it in any manner.

1-8. ADDITIONAL SAFETY INFORMATION

For more information on safe practices for setting up and operating electric welding and cutting equipment and on good working habits, ask your welding equipment supplier. For your protection, read and comply with the latest editions of the following standards:

1. ANSI Standard Z49.1 available from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
2. AWS Standard A6.1, "Recommended Safe Practices for Gas Shielded Arc Welding," available from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
3. AWS Standard F4.1, "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances," available from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126.
4. NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes," available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
5. NFPA Standard 70, "National Electrical Code," available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
6. ANSI Standard Z87.1, "Safe Practice for Occupation and Educational Eye and Face Protection," available from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
7. OSHA Standard 29 CFR, Part 1910, Subpart Q, "Welding, Cutting, and Brazing," available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.
8. CSA Standard W117.2, "Code for Safety in Welding and Cutting," available from the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario, Canada M9W 1R3.
9. See also the Standards Booklet Index in the welding power source Owner's Manual.

SECTION 2 – SAFETY PRECAUTIONS AND SIGNAL WORDS

2-1. GENERAL INFORMATION AND SAFETY

A. General

Information presented in this manual and on various labels, tags, and plates on the unit pertains to equipment design, installation, operation, maintenance, and troubleshooting which should be read, understood, and followed for the safe and effective use of this equipment.

B. Safety

The installation, operation, maintenance, and troubleshooting of arc welding equipment requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be installed, operated, and maintained only by qualified persons in accordance with this manual and all applicable codes such as, but not limited to, those listed at the end of Section 1 – Safety Rules.

2-2. SAFETY ALERT SYMBOL AND SIGNAL WORDS

The following safety alert symbol and signal words are used throughout this manual to call attention to and identify different levels of hazard and special instructions.

This safety alert symbol is used with the signal words WARNING and CAUTION to call attention to the safety statements.

WARNING statements identify procedures or practices which must be followed to avoid serious personal injury or loss of life.

CAUTION statements identify procedures or practices which must be followed to avoid minor personal injury or damage to this equipment.

IMPORTANT *statements identify special instructions necessary for the most efficient operation of this equipment.*

SECTION 3 – SPECIFICATIONS

Table 3-1. Specifications

Model	Ampere Rating at 100% Duty Cycle DCEN, ACHF	Tungsten Size Capacity	Cable Length	Torch Body	Cooling Method	Weight	
						Net	Ship
MTTC-1512HR MTTC-1512NR	*150 Amperes With Argon	.020 thru 1/8 in. (0.5 thru 3.2 mm)	12.5 ft. (3.8 m)	Length: 8.0 in. (203 mm) Handle Diameter: 0.9 in. (23 mm) Weight: 4.6 oz. (130 g)	Air	2.5 lbs. (1.1 kg)	3.0 lbs. (1.4 kg)
MTTC-1525HR MTTC-1525NR			25 ft. (7.6 m)			5.0 lbs. (2.3 kg)	5.5 lbs. (2.5 kg)
MTTC-1512VHR MTTC-1512VNR			12.5 ft. (3.8 m)	Length: 8.8 in. (222 mm) Handle Diameter: 0.9 in. (23 mm) Weight: 7.5 oz. (210 g)		2.5 lbs. (1.1 kg)	3.0 lbs. (1.4 kg)
MTTC-1525VHR MTTC-1525VNR			25 ft. (7.6 m)			5.0 lbs. (2.3 kg)	5.5 lbs. (2.5 kg)

*Rated With Gas Lens Collet Body

3-1. DUTY CYCLE

The duty cycle of a welding torch is the percentage of a ten minute period that a torch can be operated at a given load. This torch is rated at 100% duty cycle using argon shielding gas. This means that the torch can be operated at rated load conditions continuously.

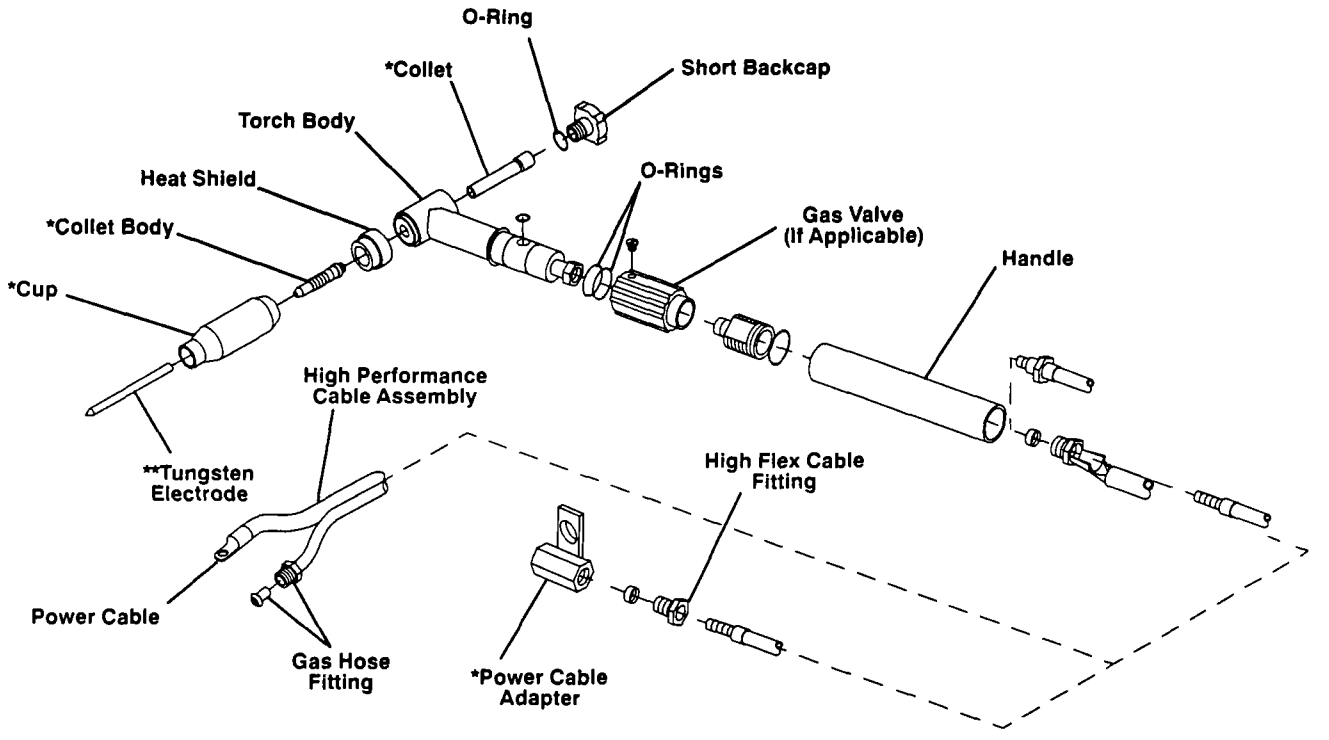
CAUTION: EXCEEDING THE RATED AMPERAGE and duty cycle can result in damage to the torch.

- *Do not exceed rated amperage and duty cycle stated in Table 3-1.*

3-2. DESCRIPTION

This air-cooled heavy duty torch is specifically for use with the Gas Tungsten Arc Welding (GTAW) process. The alphanumeric model designation refers to the following:

15 - Ampere Rating: 150 Amperes
12 - 12.5 ft. (3.8 m) Cable
25 - 25 ft. (7.6 m) Cable
H - High-Flex Cable (1 piece assembly)
N - High-Performance Cable (2 piece assembly)
R - Rigid Head
V - Gas Valve



*Required Consumables and Accessories
**Obtain from Welding Equipment Supplier

SA-120 751

Figure 4-1. Torch Components

4-1. TORCH BODY (Figure 4-1)

WARNING: ELECTRIC SHOCK can kill.

- *Do not touch live electrical parts.*
- *Shut down welding power source, and disconnect input power employing lockout/tagging procedures before installing torch.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

The torch body is shipped requiring consumables and accessories indicated in Figure 4-1: cup, collet body, collet, power cable adapter (with High-Flex Cable only), and tungsten electrode. Assemble torch as follows:

1. Install collet body into torch body making sure heat shield is in place.
2. Install cup onto collet body.
3. Remove backcap and install standard collet, slotted end first, through back of torch body into collet body. If using reverse collet, install collet with slotted end toward backcap.
4. Loosely install backcap and O-ring (supplied on backcap) onto torch body.
5. Install properly prepared tungsten electrode (see Section 6-2) through front of collet body to position electrode tip outside cup rim. Securely tighten backcap.
6. To readjust electrode position, loosen backcap.

IMPORTANT: *As a general rule, electrode extension should equal electrode diameter; but exact electrode extension may vary according to application.*

4-2. GAS HOSE CONNECTIONS AND GAS VALVE (If Applicable) (Figures 4-1 Thru 4-3)

IMPORTANT: *If power source is not equipped with a gas valve, a torch gas valve is required (see Figure 4-2).*

A. High-Flex Cable Assembly

The high-flex cable assembly contains the power cable within the gas hose. The high-flex cable has a 5/8-18 male right-hand fitting (see Figure 4-1).

To install high-flex cable, connect high-flex cable fitting to power cable adapter.

If torch includes a gas valve, connect a suitable length of gas hose (extra hose not supplied) from power cable adapter to regulator/flowmeter (see Figure 4-2).

If torch is without gas valve, connect a suitable length of gas hose (not supplied) from power cable adapter to gas

valve outlet. Connect extra gas hose (not supplied) from gas valve inlet to regulator/flowmeter (see Figure 4-3).

B. High-Performance Cable Assembly

The high-performance cable assembly has separate power cable and gas hose. The gas hose has a 5/8-18 male right-hand fitting (see Figure 4-1).

If torch includes a gas valve, connect gas hose fitting to regulator/flowmeter (extra hose not supplied, see Figure 4-2).

If torch is without gas valve, connect gas hose fitting to gas valve outlet. Connect gas hose (extra hose not supplied) from gas valve inlet to regulator/flowmeter (see Figure 4-3).

C. Torch Gas Valve Operation (If Applicable)

The gas valve allows gas flow control at the torch. A one-half turn counterclockwise opens the gas valve, and a one-half turn clockwise closes the valve.

The gas valve allows control of gas postflow time, or the length of time gas flows after the arc is extinguished. Insufficient gas postflow results in an oxidized (black) electrode surface. If an oxidized electrode were used, the black surface would contaminate the weld and cause poor arc direction.

IMPORTANT: *As a general rule, allow 10 seconds of gas postflow time per 100 amperes of weld current before closing valve.*

4-3. POWER CABLE CONNECTION (Figures 4-1 Thru 4-3)

WARNING: ELECTRIC SHOCK can kill.

- *Do not touch live electrical parts.*
- *Shut down welding power source, and disconnect input power employing lockout/tagging procedures before installing torch.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

A. High-Flex Cable Assembly

The power cable is part of the high-flex cable assembly. For connection of both power cable and gas hose to power cable adapter, see Section 4-2A.

Connect power cable adapter to weld output terminal (see Figures 4-2 and 4-3).

B. High-Performance Cable Assembly

The high-performance cable assembly has separate power cable and gas hose.

To install power cable, connect power cable connector to weld output terminal (see Figures 4-2 and 4-3).

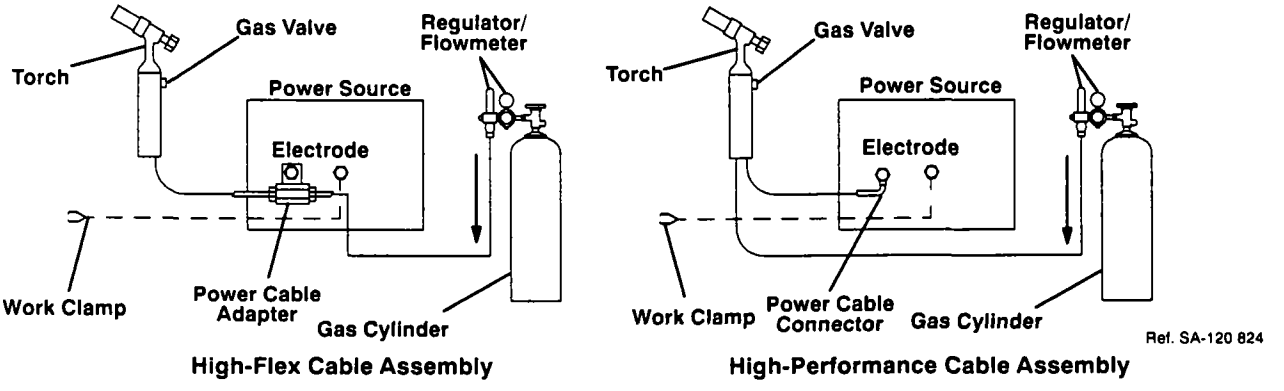


Figure 4-2. GTAW Torch Connection Diagram For Models With Gas Valve

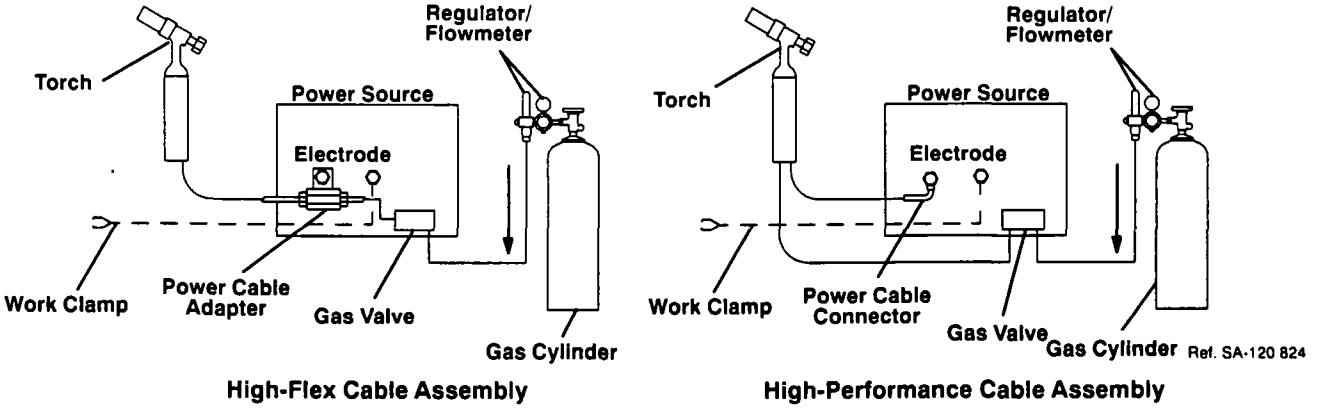


Figure 4-3. GTAW Torch Connection Diagram For Models Without Gas Valve

SECTION 5 – SEQUENCE OF OPERATION

WARNING: ELECTRIC SHOCK can kill.

- *Do not touch live electrical parts.*
- *Keep all covers and handle in place while operating.*

ARC RAYS, SPARKS, AND HOT SURFACES can burn eyes and skin; NOISE can damage hearing.

- *Wear correct eye, ear, and body protection.*

FUMES AND GASES can seriously harm your health.

- *Keep your head out of the fumes.*
- *Ventilate to keep from breathing fumes and gases.*
- *If ventilation is inadequate, use approved breathing device.*

HOT METAL, SPATTER, AND SLAG can cause fire and burns.

- *Watch for fire.*
- *Keep a fire extinguisher nearby, and know how to use it.*
- *Do not use near flammable material.*
- *Allow work and equipment to cool before handling.*

MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.

- *Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.*

See Section 1 - Safety Rules for additional information.

5-1. GAS TUNGSTEN ARC WELDING (GTAW)

1. Install and connect torch according to Section 4.
2. Make sure backcap and all gas connections are securely tightened.
3. With regulator/flowmeter valve closed, open gas cylinder valve.
4. Set power source for desired welding amperage.
5. Wear dry insulating gloves and clothing, and wear welding helmet with proper filter lens according to ANSI Z49.1.
6. Energize welding power source.
7. Set gas flow to desired level (requires open gas valve).

IMPORTANT: *Purge gas hose to clear hose of air, moisture, or any other contaminants. Allow gas to flow 2 to 3 minutes on new torch; 5 to 6 seconds thereafter.*

8. Begin welding.

5-2. SHUTTING DOWN

1. Stop welding.

IMPORTANT: *As a general rule, allow 10 seconds of gas postflow time per 100 amperes of weld current before closing valve.*

2. Turn off welding power source.
3. Turn off the shielding gas at the source.

WARNING: HIGH CONCENTRATION OF SHIELDING GAS can harm health or kill.

- *Shut off gas supply when not in use.*

SECTION 6 – MAINTENANCE

6-1. ROUTINE MAINTENANCE (Table 6-1)

WARNING: ELECTRIC SHOCK can kill; HOT SURFACES can cause severe burns.

- *Do not touch live electrical parts.*
- *Shut down welding power source and disconnect input power before working on torch.*
- *Disconnect torch from welding power source before inspecting, maintaining, or servicing.*
- *Allow a cooling period before servicing.*

Table 6-1. Maintenance Schedule

Frequency*	Maintenance
Every Week	Inspect and clean torch, cables, and hoses (see Sections 6-1A thru 6-1C).
	Check and replace torch parts or weld cables as necessary (see Sections 6-1A thru 6-1C).

*Frequency of service is based on units operated 40 hours per week. Increase frequency of maintenance if usage exceeds 40 hours per week.

A. Inspection And Cleaning

WARNING: Read and follow safety information at beginning of entire Section 6-1 before proceeding.

Inspect torch for broken areas, cracks and loose parts; tighten, repair and replace as required.

Remove grease and dirt from components, and moisture from electrical parts and cables.

B. Torch Body

WARNING: Read and follow safety information at beginning of entire Section 6-1 before proceeding.

Once a week inspect condition of torch body components.

Replace cup, heat shield, backcap, and O-rings if cracked. Maintain tight fit of torch components to ensure good weld quality.

C. Hoses, Connections, And Cables

WARNING: Read and follow safety information at beginning of entire Section 6-1 before proceeding.

Once a week inspect hoses and connections.

1. Gas

Gas leaks may result in poor weld quality. Inspect hoses for breaks. Keep connections clean and tight.

2. Power Cable

Inspect cables for breaks in insulation, and ensure that all connections are clean and tight. Repair or replace cables if insulation breaks are present. Clean and tighten connections at each inspection.

6-2. TUNGSTEN ELECTRODE (Table 6-2 And Figures 6-1 And 6-2)

Use Table 6-2 to select the correct size and type tungsten electrode. Prepare the tungsten electrode using the following guidelines. A properly prepared tungsten electrode is essential in obtaining a satisfactory weld.

A. For AC or DC Electrode Positive Welding (Figure 6-1)

Ball the end of tungsten electrodes used for ac or dc electrode positive welding before beginning the welding operation. Weld amperage causes the tungsten electrode to form the balled end. The diameter of the end should not exceed the diameter of the tungsten electrode by more than 1-1/2 times. For example, the end of a 1/8 in. (3.2 mm) diameter tungsten electrode should not exceed a 3/16 in. (4.8 m) diameter end.

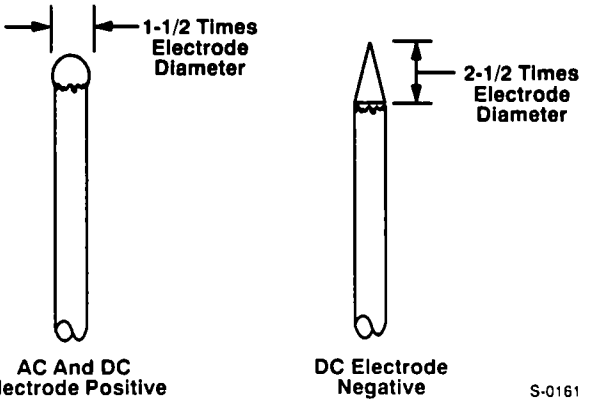


Figure 6-1. Properly Prepared Tungsten Electrodes

B. For DC Electrode Negative Welding (Figures 6-1 And 6-2)

CAUTION: HOT FLYING METAL PARTICLES can injure personnel, start fires, and damage equipment; TUNGSTEN CONTAMINATION can lower weld quality.

- *Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.*
- *Do not use same wheel for any other job, or the tungsten will become contaminated.*
- *Shape tungsten electrodes on a fine grit, hard abrasive wheel used only for tungsten shaping. Grind tungsten electrodes so that grinding marks run lengthwise with the electrode. These procedures reduce the possibility of the tungsten electrode transferring foreign matter into the weld and help reduce arc wander.*

Grind the end of the tungsten electrode to a taper for a distance of 2 to 2-1/2 electrode diameters in length. For example, the ground surface for a 1/8 in. (3.2 mm) diameter tungsten electrode should be 1/4 to 5/16 in. (6.4 to 8.0 mm) long.

For additional information, see your distributor for a handbook on the Gas Tungsten Arc Welding (GTAW) process.

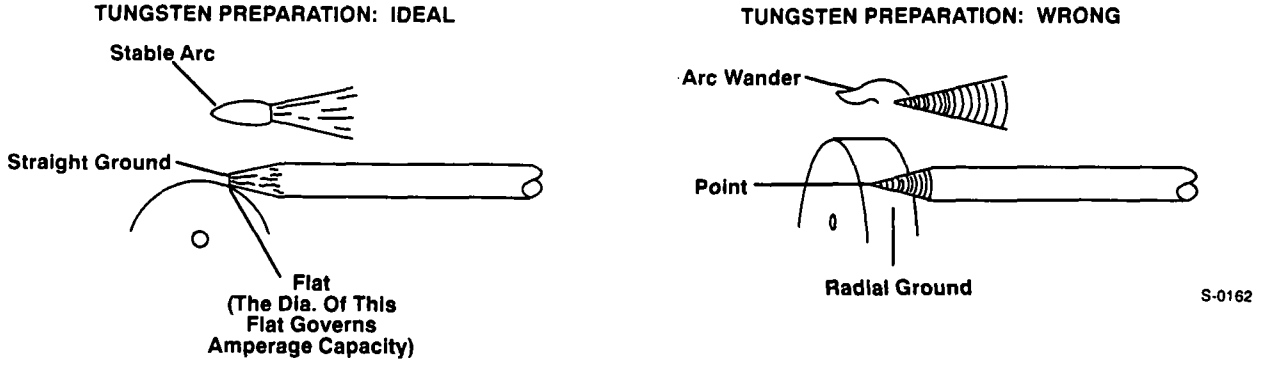


Figure 6-2. Tungsten Preparation

Table 6-2. Tungsten Size

Electrode Diameter	Amperage Range - Polarity - Gas Type			
Pure Tungsten (Green Band)	DC-Argon Electrode Negative/Straight Polarity	DC-Argon Electrode Positive/Reverse Polarity	AC-Argon Using High Frequency	AC-Argon Balanced Wave Using High Freq.
.010"	Up to 15	*	Up to 15	Up to 10
.020"	5-20	*	5-20	10-20
.040"	15-80	*	10-60	20-30
1/16"	70-150	10-20	50-100	30-80
3/32"	125-225	15-30	100-160	60-130
1/8"	225-360	25-40	150-210	100-180
5/32"	360-450	40-55	200-275	160-240
3/16"	450-720	55-80	250-350	190-300
1/4"	720-950	80-125	325-450	250-400
2% Thorium Alloyed Tungsten (Red Band)				
.010"	Up to 25	*	Up to 20	Up to 15
.020"	15-40	*	15-35	5-20
.040"	25-85	*	20-80	20-60
1/16"	50-160	10-20	50-150	60-120
3/32"	135-235	15-30	130-250	100-180
1/8"	250-400	25-40	225-360	160-250
5/32"	400-500	40-55	300-450	200-320
3/16"	500-750	55-80	400-500	290-390
1/4"	750-1000	80-125	600-800	340-525
Zirconium Alloyed Tungsten (Brown Band)				
.010"	*	*	Up to 20	Up to 15
.020"	*	*	15-35	5-20
.040"	*	*	20-80	20-60
1/16"	*	*	50-150	60-120
3/32"	*	*	130-250	100-180
1/8"	*	*	225-360	160-250
5/32"	*	*	300-450	200-320
3/16"	*	*	400-550	290-390
1/4"	*	*	600-800	340-525

*NOT RECOMMENDED
The figures listed are intended as a guide and are a composite of recommendations from American Welding Society (AWS) and electrode manufacturers.

S-0009/8-88

SECTION 7 – PARTS LIST

Item No.	Stock No.	Model No.	Description	Quantity Model HR VHR	Quantity Model NR VNR
			Figure 7-1. Complete Torch Assemly		
1			TUNGSTEN, electrode (consult your welding supply distributor)		
2			CUP, (see Fig 7-2)		
3			COLLET BODY, (see Fig 7-2)		
4	116 211		TORCH BODY, w/ heatshield (consisting of)	1	1
5	116 256	300HS	· HEATSHIELD, std	1	1
5	♦119 914	3GHS	HEATSHIELD, sm dia gas lens	1	1
5	♦119 915	3GHSLD	HEATSHIELD, lg dia gas lens	1	1
4	116 212		TORCH BODY, w/ heatshield, valve & handle adapter (consisting of)	1	1
5	116 256	300HS	· HEATSHIELD, medium	1	1
6	116 219	01-0012	· O-RING	1	1
7	116 217	01-0002	· O-RING	2	2
8	116 216	FLHV	· VALVE HANDLE (consisting of)	1	1
9	116 218	01-0007	· · SCREW, non-conductive	1	1
10	116 220	01-0013	· HANDLE ADAPTER (consisting of)	1	1
11	116 217	01-0002	· · O-RING	1	1
12			COLLET (see Fig 7-2)		
13	116 259	300S	BACKCAP, short (consisting of)	1	1
13	♦116 258	300M	BACKCAP, medium (consisting of)	1	1
13	♦116 257	300L	BACKCAP, long (consisting of)	1	1
14	116 260	300R	· O-RING	1	1
15	117 585		HANDLE	1	1

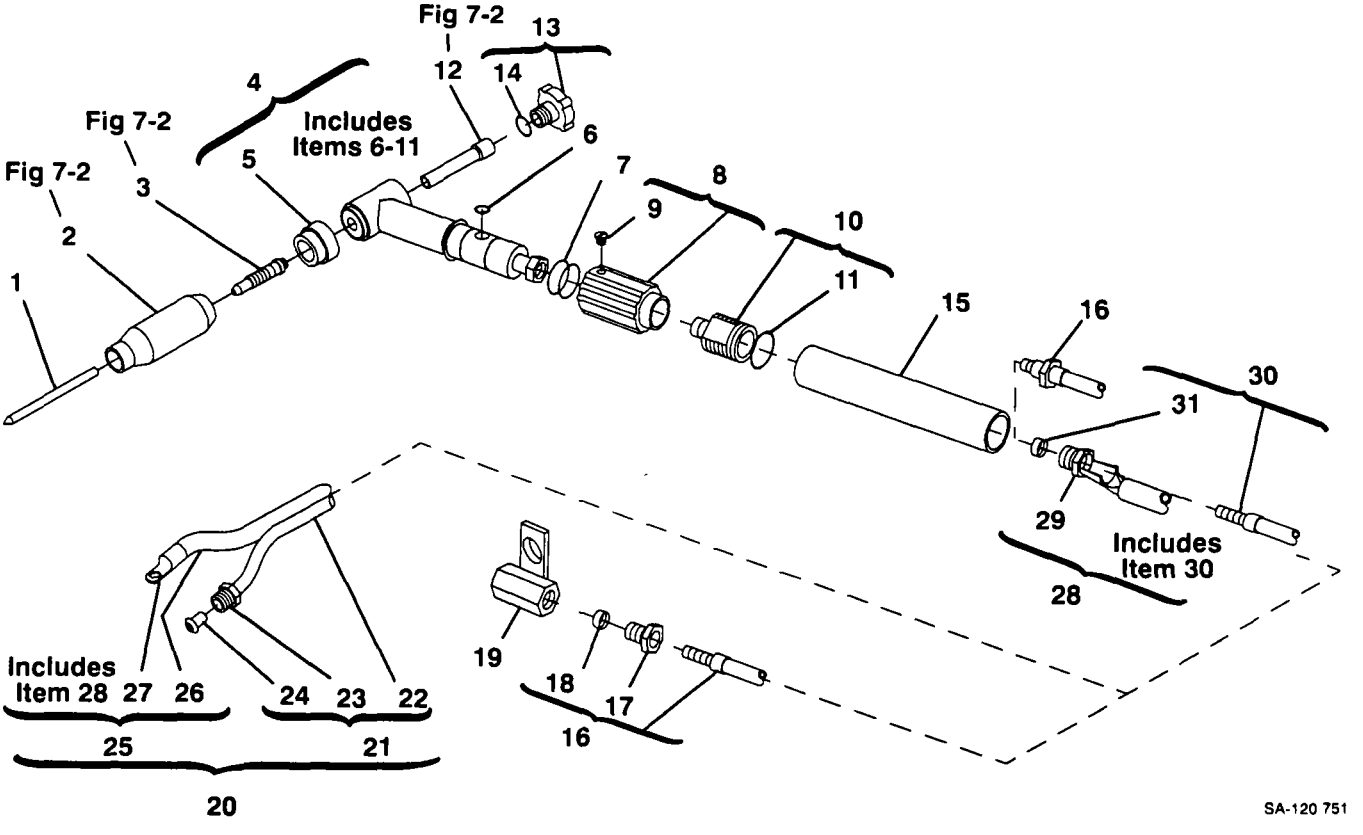


Figure 7-1. Complete Torch Assembly

Item No.	Stock No.	Model No.	Description	Quantity Model HR VHR	Quantity Model NR VNR
			Figure 7-1. Complete Torch Assemly (Continued)		
16	116 271	1512PCHF	HI-FLEX POWER CABLE, 12-1/2ft (consisting of)	1	
16	116 272	1525PCHF	HI-FLEX POWER CABLE, 25ft (consisting of)	1	
17	120 721		· RH NUT	2	
18	120 720		· RING NUT	2	
19	♦116 276	15PCA	POWER CABLE ADAPTER	1	
20	116 261	1512PCN	HI-PERFORMANCE POWER CABLE & HOSE, 12-1/2ft (consisting of)		1
20	116 262	1525PCN	HI-PERFORMANCE POWER CABLE & HOSE, 25ft (consisting of)		1
21	116 267	212AH	· GAS HOSE, 12 -1/2ft (consisting of)		1
21	116 268	225AH	· GAS HOSE, 25ft (consisting of)		1
22	116 512		· · HOSE, black 1/8 ID (order by ft as req'd)		
23	116 266	2AN	· · GAS NUT		1
24	116 269	3HF	· · HOSE FITTING		1
25	116 264	1512CN	· POWER CABLE, 12-1/2ft (consisting of)		1
25	116 265	1525CN	· POWER CABLE, 25ft (consisting of)		1
26	600 317		· · CABLE, weld-copper No. 4 (order by ft as req'd)		
27	116 270	5PF	· · POWER CABLE FITTING		1
28	116 263	15PFN	· · POWER CABLE FITTING, (consisting of)		1
29	120 729		· · · CRIMP, cable		1
30	120 761		· · · FITTING, gas (consisting of)		1
31	120 720		· · · · RING NUT		1

♦OPTIONAL
BE SURE TO PROVIDE MODEL AND STYLE NUMBER WHEN ORDERING REPLACEMENT PARTS.

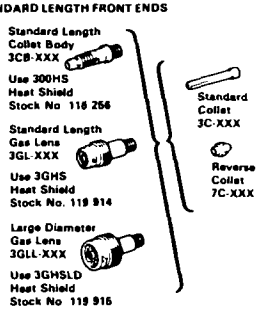
CONSUMABLE PARTS SELECTOR

(Note: Collet, Collet Body And Gas Cup Required To Complete Torch.) Torches With High Flex Composite Cable Also Require A Power Cable Adapter.

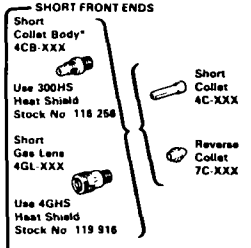
STANDARD LENGTH FRONT ENDS

Tungsten Diameter	in. (mm)	.020" (0.5)	.040" (1.0)	1/16" (1.6)	3/32" (2.4)	1/8" (3.2)
Amperage Range	ACHF	5-20	10-80	50-150	100-235	150-325
	DCSP	5-20	15-80	70-150	150-250	220-350
Collet (Standard)	Model No.	3C20	3C40	3C116	3C332	3C418
	Stock No.	116 367	116 368	116 369	116 370	116 371
Collet (Reverse)	Model No.	7C20	7C40	7C116	7C332	7C418
	Stock No.	116 379	116 380	116 381	116 382	116 383
Collet Body (Std. Lgth.)	Model No.	3CB20	3CB40	3CB116	3CB332	3CB418
	Stock No.	116 361	116 362	116 363	116 364	116 365

	Stock/Model No.						Cup Orifice
Cup, Ceramic 1-27/32" Long	116 347 (3C3)						3/16"
	116 348 (3C4)						1/4"
	116 349 (3C5)						5/16"
	116 350 (3C6)						3/8"
	116 351 (3C7)						7/16"
	116 352 (3C8)						1/2"
	116 353 (3C10)						5/8"
	116 354 (3C12)						3/4"
Cup, Ceramic 3-7/32" Long	116 343 (3C4L)						1/4"
	116 344 (3C5L)						5/16"
	116 345 (3C6L)						3/8"
	116 346 (3C7L)						7/16"
Cup, Alumina 1-27/32" Long	116 330 (3A4)						1/4"
	116 331 (3A5)						5/16"
	116 332 (3A6)						3/8"
	116 333 (3A7)						7/16"
	116 334 (3A8)						1/2"
	116 335 (3A10)						5/8"
	116 336 (3A12)						3/4"
Gas Lens Collet Body Std. Lgth.	Model No.	3GL20	3GL40	3GL116	3GL332	3GL418	
	Stock No.	119 926	119 927	119 928	119 929	119 930	
	Stock/Model No.						
Cup, Ceramic - Gas Lens 1-5/8" Long	119 917 (3CG4)						1/4"
	119 918 (3CG5)						5/16"
	119 919 (3CG6)						3/8"
	119 920 (3CG7)						7/16"
	119 921 (3CG8)						1/2"
3CG11 is 1-1/8" Long	119 922 (3CG11)						11/16"
	119 923 (3CG12)						3/4"
	119 924 (3CG14)						7/8"
	119 925 (3CG16)						1"
Cup, Alumina - Gas Lens 1-5/8" Long	119 932 (3AG4)						1/4"
	119 933 (3AG5)						5/16"
	119 934 (3AG6)						3/8"
	119 935 (3AG7)						7/16"
	119 936 (3AG8)						1/2"
	119 937 (3AG11)						11/16"
Gas Lens Collet Body Lg. Dia.	Model No.				3GLL332	3GLL418	
	Stock No.				119 902	119 903	
	Stock/Model No.						
Cup, Alumina 1-7/8" Long	119 911 (3AG8LD)						1/2"
	119 912 (3AG10LD)						5/8"
	119 913 (3AG12LD)						3/4"


Standard Length Collet Body 3CB-XXX
Use 300HS Heat Shield Stock No 116 256
Standard Length Gas Lens 3GL-XXX
Use 3GHS Heat Shield Stock No. 119 914
Large Diameter Gas Lens 3GLL-XXX
Use 3GHSLD Heat Shield Stock No 119 915
Standard Collet 3C-XXX
Reverse Collet 7C-XXX

SHORT FRONT ENDS


Short Collet Body* 4CB-XXX
Use 300HS Heat Shield Stock No 116 256
Short Gas Lens 4GL-XXX
Use 4GHS Heat Shield Stock No 119 916
Short Collet 4C-XXX
Reverse Collet 7C-XXX

*Reduce Continuous Duty Rating By 25% When Using Short Collet/Collet Body.

Tungsten Diameter	in. (mm)	.020" (0.5)	.040" (1.0)	1/16" (1.6)	3/32" (2.4)	1/8" (3.2)
Amperage Range	ACHF	5-20	10-80	50-150	100-235	150-325
	DCSP	5-20	15-80	70-150	150-250	220-350
Collet (Short)	Model No.	4C20	4C40	4C116	4C332	4C418
	Stock No.	116 373	116 374	116 375	116 376	116 377
Collet (Reverse)	Model No.	7C20	7C40	7C116	7C332	7C418
	Stock No.	116 379	116 380	116 381	116 382	116 383
Collet Body (Short)	Model No.	4CB20	4CB40	4CB116	4CB332	4CB418
	Stock No.	116 355	116 356	116 357	116 358	116 359

	Stock/Model No.						Cup Orifice
Cup, Ceramic 1-5/32" Long	116 337 (2C4)						1/4"
	116 338 (2C5)						5/16"
	116 339 (2C6)						3/8"
	116 340 (2C7)						7/16"
*1-1/8" Long	*116 341 (2C8)						1/2"
	*116 342 (2C10)						5/8"
Cup, Ceramic - Long 1-7/8"	116 326 (2C3L)						3/16"
	116 327 (2C4L)						1/4"
	116 328 (2C5L)						5/16"
	116 329 (2C6L)						3/8"
Cup, Alumina 1-5/32" Long	116 310 (2A4)						1/4"
	116 311 (2A5)						5/16"
	116 312 (2A6)						3/8"
	116 313 (2A7)						7/16"
	116 314 (2A8)						1/2"
	116 315 (2A10)						5/8"
Gas Lens Collet Body - Short	Model No.	4GL20	4GL40	4GL116	4GL332	4GL418	
	Stock No.	119 905	119 906	119 907	119 908	119 909	
	Stock/Model No.						
Cup, Alumina 1" Long	119 893 (2AG4)						1/4"
	119 894 (2AG5)						5/16"
	119 895 (2AG6)						3/8"
	119 896 (2AG7)						7/16"

SHADED AREAS INDICATE RECOMMENDED USAGE

Figure 7-2. Consumable Parts

Table 7-1. Cross Reference To Competitive Model

STOCK NO.	MODEL NO.	COMPETITIVE NO.
116 367	3C20	10N21
116 368	3C40	10N22
116 369	3C116	10N23
116 370	3C332	10N24
116 371	3C418	10N25
116 379	7C20	N/A
116 380	7C40	N/A
116 381	7C116	N/A
116 382	7C332	N/A
116 383	7C418	N/A
116 361	3CB20	10N29
116 362	3CB40	10N30
116 363	3CB116	10N31
116 364	3CB332	10N32
116 365	3CB418	10N28
116 347	3C3	N/A
116 348	3C4	105Z43
116 349	3C5	105Z42
116 350	3C6	105Z44
116 351	3C7	105Z45
116 352	3C8	08N78
116 353	3C10	08N79
116 354	3C12	08N80
116 343	3C4L	12N03
116 344	3C5L	105Z60
116 345	3C6L	12N02
116 346	3C7L	105Z61
116 330	3A4	10N50
116 331	3A5	10N49
116 332	3A6	10N48
116 333	3A7	10N47
116 334	3A8	10N46
116 335	3A10	10N45
116 336	3A12	10N44
119 926	3GL20	45V29
119 927	3GL40	45V24
119 928	3GL116	45V25
119 929	3GL332	45V26
119 930	3GL418	45V27
119 917	3CG4	54N35
119 918	3CG5	54N34
119 919	3CG6	54N33
119 920	3CG7	54N32
119 921	3CG8	54N31
119 922	3CG11	54N35
119 923	3CG12	N/A
119 924	3CG14	N/A
119 925	3CG16	N/A
119 932	3AG4	54N18
119 933	3AG5	54N17
119 934	3AG6	54N16
119 935	3AG7	54N15
119 936	3AG8	54N14
119 937	3AG11	54N19
119 902	3GLL332	45V64
119 903	3GLL418	995795
119 911	3AG8LD	57N74
119 912	3AG10LD	53N88
119 913	3AG12LD	53N87
116 373	4C20	N/A
116 374	4C40	10N22S
116 375	4C116	10N23S
116 376	4C332	10N24S
116 377	4C418	10N25S
116 379	7C20	N/A
116 380	7C40	N/A
116 381	7C116	N/A
116 382	7C332	N/A
116 383	7C418	N/A
116 355	4CB20	N/A
116 356	4CB40	17CB20
116 357	4CB116	17CB20
116 358	4CB332	17CB20
116 359	4CB418	17CB20
116 337	2C4	13N14
116 338	2C5	13N15
116 339	2C6	13N16
116 340	2C7	13N17
116 341	2C8	13N18
116 342	2C10	13N19
116 326	2C3L	796F70
116 327	2C4L	796F71
116 328	2C5L	796F72
116 329	2C6L	796F73
116 310	2A4	13N08
116 311	2A5	13N09
116 312	2A6	13N10
116 313	2A7	13N11
116 314	2A8	13N12
116 315	2A10	13N13
119 905	4GL20	N/A
119 906	4GL40	N/A
119 907	4GL116	N/A
119 908	4GL332	N/A
119 909	4GL418	N/A
119 893	2AG4	53N58
119 894	2AG5	53N59
119 895	2AG6	53N60
119 896	2AG7	53N61